

In re Application of Tipping et al.  
Serial No. 09/520,678

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**AMENDMENTS TO THE CLAIMS**

Please amend the claims as follows (*wherein additions are shown by underlining and deletions are shown by strikethrough in amended claims*):

**OFFICIAL**

1. (Previously presented): A computer-implemented method for modeling a data set comprising:

selecting an initial set of hyperparameters for determining a prior distribution for the data set for modeling thereof, the prior distribution approximated by a product of a distribution of the set of hyperparameters, a distribution of a set of weights, and a distribution of a set of predetermined additional parameters;

interactively updating the distribution of the set of weights, the distribution of the set of hyperparameters, and the distribution of the set of predetermined additional parameters until a predetermined convergence criterion has been reached,

such that the product of the distribution of the set of hyperparameters, the distribution of the set of weights, and the distribution of the set of predetermined additional parameters as have been iteratively updated approximates the posterior distribution for modeling of the data set for probabilistic prediction; and,

outputting at least the product approximating the posterior distribution for modeling of the data set.

2. (Original): The method of claim 1, further comprising initially inputting the data set to be modeled.

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3. (Canceled.)

4. (Original): The method of claim 1, wherein the data set comprises a continuous data set, such that the set of predetermined additional parameters comprises a set of parameters accounting for noise.

5. (Original): The method of claim 1, wherein the data set comprises a discrete data set, such that the set of predetermined additional parameters comprises a set of parameters accounting for a lower bound.

6. (Canceled)

7. (Currently amended): A computer-implemented method comprising:  
inputting a data set to be modeled;  
determining a relevance vector learning machine via a variational approach to  
obtain a posterior distribution for the data set ~~The method of claim 6,~~ wherein determining  
the relevance vector learning machine ~~comprises: selecting~~ comprises selecting an initial set  
of hyperparameters for determining ~~the~~ a prior distribution for the data set, the prior  
distribution approximated by a product of a distribution of the set of hyperparameters, a  
distribution of a set of weights, and a distribution of a set of predetermined additional  
parameters; ~~and~~ interactively updating the distribution of the set of weights, the  
distribution of the set of hyperparameters, and the distribution of the set of predetermined  
additional parameters until a predetermined convergence criterion has been reached; and

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outputting at least the posterior distribution for the data set for probabilistic prediction.

8. (Currently amended): A computer-implemented method comprising:  
inputting a discrete data set to be modeled;  
determining a relevance vector learning machine via a variational approach to  
obtain a posterior distribution for the data set ~~The method of claim 6, wherein the data set~~  
~~comprises a discrete data set,~~ such that ~~the~~ a set of predetermined additional parameters  
comprises a set of parameters accounting for a lower bound; and  
outputting at least the posterior distribution for the data set for probabilistic  
prediction.

9. (Currently amended): A computer-implemented method comprising:  
inputting a continuous data set to be modeled;  
determining a relevance vector learning machine via a variational approach to  
obtain a posterior distribution for the data set ~~The method of claim 6, wherein the data set~~  
~~comprises a continuous data set,~~ such that ~~the~~ a set of predetermined additional parameters  
comprises a set of parameters accounting for noise; and  
outputting at least the posterior distribution for the data set for probabilistic  
prediction.

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10. (Previously presented): A machine-readable medium having instructions stored thereon for execution by a processor to perform a method for modeling a continuous data set comprising:

selecting an initial set of hyperparameters for determining a prior distribution for the continuous data set for modeling thereof, the prior distribution approximated by a product of a distribution of the set of hyperparameters, a distribution of a set of weights, and a distribution of a set of parameters accounting for noise;

interactively updating the distribution of the set of weights, the distribution of the set of hyperparameters, and the distribution of the set of parameters accounting for noise until a predetermined convergence criterion has been reached,

such that the product of the distribution of the set of hyperparameters, the distribution of the set of weights, and the distribution of the set of parameters accounting for noise as have been iteratively updated approximates the posterior distribution for modeling of the continuous data set for probabilistic prediction; and,

outputting at least the product approximating the posterior distribution for modeling of the continuous data set.

11. (Original): The medium of claim 10, wherein the method further comprises initially inputting the continuous data set to be modeled.

12. (Canceled.)

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13. (Previously presented): A machine-readable medium having instructions stored thereon for execution by a processor to perform a method for modeling a discrete data set comprising:

selecting an initial set of hyperparameters for determining a prior distribution for the discrete data set for modeling thereof, the prior distribution approximated by a product of a distribution of the set of hyperparameters, a distribution of a set of weights, and a distribution of a set of parameters accounting for a lower bound;

interactively updating the distribution of the set of weights, the distribution of the set of hyperparameters, and the distribution of the set of parameters accounting for a lower bound until a predetermined convergence criterion has been reached,

such that the product of the distribution of the set of hyperparameters, the distribution of the set of weights, and the distribution of the set of parameters accounting for a lower bound as have been iteratively updated approximates the posterior distribution for modeling of the discrete data set for probabilistic prediction; and,

outputting at least the product approximating the posterior distribution for modeling of the discrete data set.

14. (Previously presented): The medium of claim 13, wherein the method further comprises initially inputting the discrete data set to be modeled.

15. (Canceled.)

16. (Canceled)

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17. (Currently amended): A machine-readable medium having instructions stored thereon for execution by a processor to perform a method comprising:  
inputting a data set to be modeled;  
determining a relevance vector learning machine via a variational approach to obtain a posterior distribution for the data set for probabilistic prediction ~~The medium of claim 16,~~ wherein determining the relevance vector learning machine comprises: selecting an initial set of hyperparameters for determining ~~the~~ a prior distribution for the data set, the prior distribution approximated by a product of a distribution of the set of hyperparameters, a distribution of a set of weights, and a distribution of a set of predetermined additional parameters; and; interactively updating the distribution of the set of weights, the distribution of the set of hyperparameters, and the distribution of the set of predetermined additional parameters until a predetermined convergence criterion has been reached; and  
outputting at least the posterior distribution for the data set.

18. (Currently amended): A machine-readable medium having instructions stored thereon for execution by a processor to perform a method comprising:  
inputting a discrete data set to be modeled;  
determining a relevance vector learning machine via a variational approach to obtain a posterior distribution for the data set for probabilistic prediction ~~The medium of claim 16,~~ wherein ~~the data set comprises a discrete data set,~~ such that ~~the~~ a set of predetermined additional parameters comprises a set of parameters accounting for a lower bound; and

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outputting at least the posterior distribution for the data set.

19. (Currently amended): A machine-readable medium having instructions  
stored thereon for execution by a processor to perform a method comprising:  
inputting a continuous data set to be modeled;  
determining a relevance vector learning machine via a variational approach to  
obtain a posterior distribution for the data set for probabilistic prediction ~~The medium of~~  
~~claim 16, wherein the data set comprises a continuous data set,~~ such that the a set of  
predetermined additional parameters comprises a set of parameters accounting for noise;  
and  
outputting at least the posterior distribution for the data set.